An online exploration of Arizona's biotic communities with an emphasis on Language Arts and Social Studies

Exploring Arizona's Biotic Communities

Lesson 1: Mapping Biotic Communities

LESSON OVERVIEW

Students read online information and take notes using graphic organizers and reading strategies to reinforce their understanding. Students learn about biotic communities and locate them on shaded relief maps.

SUGGESTED GRADE LEVELS

- 6 – 10

ENDURING UNDERSTANDINGS

- Ecosystems, which are based on differences in soil, climate, and human and natural disturbances, can be defined on local or global scales.
- Arizona has a tremendous natural diversity because of the state's variety of ecosystems.
- Maps come in various types, including thematic (rainfall, population, vegetation) and topographic.
- Nonfiction authors organize information to help the reader comprehend.

OBJECTIVES

Students will:

- Define key terms (e.g., biotic community, topography, adaptation, and others as appropriate for the grade level).
- Read, understand, and take effective notes on key concepts and terms in the selected reading.
- Recognize the main idea and supporting details.
- Locate places, elevations, and biotic communities on a map.

ARIZONA DEPARTMENT OF EDUCATION STANDARDS

Grade	Reading	Writing	Social Studies
6	S3-C1-02; S3-C1-09	S3-C2-01; S3-C6-01	S4-C1-01; S4-C1-03; S4-C1-05; S4-C2-02
7	S3-C1-02; S3-C1-10	S3-C2-01; S3-C6-01	S4-C1-01; S4-C1-03; S4-C1-05; S4-C2-02; S4-C5-01
8	S3-C1-02; S3-C1-10	S3-C2-01; S3-C6-01	S4-C1-01; S4-C1-03; S4-C1-05

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9	S3-C1-01; S3-C1-08		S4-C1-01; S4-C1-02;
10	S3-C1-01; S3-C1-07; S3-C1-08		

Note: The full text of these standards can be found in Appendix A.

TIME FRAME

- 2 days (45 minutes each day)

MATERIALS

- Access to "Exploring Arizona's Natural Resources" (Web site or CD available from azgfd.gov)
- World map
- *Reading Anticipation Guide* (one per student)
- *Biotic Communities Graphic Organizer* (one per student)
- *Map of Arizona: Student Version* (one per student)
- *Map of Arizona: Teacher Version* (one transparency)
- *Arizona Topography Map* (one per group)
- *Average Annual Precipitation Map* (one per group)
- *Mapping Biotic Communities Rubric* (one per group)
- Blank overhead transparency

TEACHER PREPARATION

- Review "Exploring Arizona's Natural Resources" and select vocabulary specific to the grade level being taught.
- Be sure computers with Internet access are available.
- Prepare a paragraph describing your own "biotic community" to share with students as a model paragraph.
- Decide on groupings for student teams. Four is the recommended number in a group. It is best to use heterogeneous teams.
- Make copies of *Arizona Topography Map, Average Annual Precipitation Map* and the *Mapping Biotic Communities Rubric* for each group.
- Make copies of *Biotic Communities Graphic Organizer* and *Reading Anticipation Guide* for each student.

SUGGESTED PROCEDURES

Session 1:

1. Survey students to see where they were born.
2. Students write a short descriptive paragraph describing that place. Include terrain type (mountainous, desert, forest, plains…), temperature, rainfall, etc. (Be flexible. If a student prefers to write about a place he feels closer to, that's okay.)
3. Discuss a few of these places. Ask students to talk about temperature, rainfall, type of terrain, urban or rural setting—any features you want to emphasize. Be sure to introduce the vocabulary words appropriate to your level. Begin to introduce the term "biotic community" as a group of plants and animals living in the same area that interact with one another.

4. Using a world map, point out the polar regions. Discuss why no one was born there. Ask them what kinds of animals might live in such cold places, and how are they able to survive? Include the term "adaptation" in your discussion. Lead the students into a discussion about what is required in a habitat for humans to live there.
5. Students now add a paragraph to their papers discussing how humans have "adapted" to living in the places they described (e.g., we have developed ways to cool our homes to make them comfortable in the desert's extreme heat).
6. Students complete Part 1 of the *Reading Anticipation Guide*.
7. When completed, allow students time to read and take notes on the "Explore Arizona" section of the Web site, stopping after the section on "Development" under "Changes Over Time." Be sure to have them pull out unfamiliar vocabulary terms and list them on a separate sheet of paper. This will be particularly useful for the next lesson.
8. Using their notes, students complete Part 2 of the *Reading Anticipation Guide*.

Session 2:

1. Students hand in the *Reading Anticipation Guide*. Ask if they were surprised by anything in their reading. Discuss.
2. Model web or spider mapping on the overhead projector by reading the "Alpine Tundra" section together (see sample web).
3. Give students the opportunity to use this technique by reading and taking notes on each of the remaining biotic communities. *Alternative: assign teams of students to different communities and ask them to present their findings to the rest of the class*.
4. Briefly discuss their observations about the various communities. How are they different? Where can they be found?
5. Distribute copies of the *Map of Arizona.* Use the overhead and the teacher version of the Arizona map to help students locate key places on their maps (e.g., Grand Canyon, Salt River, Colorado River, Yuma, Page, Sunrise Ski Area, etc.). Ask students to name places they have visited in Arizona and help them locate these on the projected map. Have them place these locations on their outline maps.
6. Divide the students into their teams, and give each team the *Arizona Topography* and *Average Annual Precipitation* maps and a scoring rubric. Clarify items on the rubric if needed.
7. Working as teams, students locate the various biotic communities on the shaded relief map and then mark the locations on their outline maps. Students must use elevation, rainfall, and other information from the Web site to make their decisions. Teams should decide on a separate color to designate each biotic community and shade in the area using that color.
8. Each student independently makes a key to the map.
9. Students turn in their Biotic Communities map.

ASSESSMENT

- Informal evaluation of participation in the group activity
- Biotic Communities map using the rubric provided
- *Reading Anticipation Guide*

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EXTENSIONS

- Students may conduct a Web search to find information on the differences in the criteria used by various scientific fields to define or delineate biotic communities. For example, do plant biologists and animal biologists use the same or different criteria to designate biotic communities?

Appendix A: Arizona Department of Education Standards – Full Text

Reading Standards

Grade	Strand	Concept	Performance Objective
6	3	1 – Expository Text	2 – Summarize the main idea and critical details of expository text, maintaining chronological or logical order 9 – Draw valid conclusions about expository text, supported by text evidence
7	3	1 – Expository Text	2 – Summarize the main idea (stated or implied) and critical details of expository text, maintaining chronological order, sequential, or logical order 10 – Make relevant inferences about expository text, supported by text evidence
8	3	1 – Expository Text	2 – Summarize the main idea (stated or implied) and critical details of expository text, maintaining chronological order, sequential, or logical order 10 – Make relevant inferences about expository text, supported by text evidence
9	3	1 – Expository Text	1 – Compare (and contrast) original text to a summary for accuracy of the main ideas, inclusion of critical details, and the extent to which it conveys the underlying meaning of the original text 8 – Support conclusions drawn from ideas and concepts in expository text
10	3	1 – Expository Text	1 – Compare (and contrast) original text to a summary for accuracy of the main ideas, inclusion of critical details, and the extent to which it conveys the underlying meaning of the original text 7 – Make relevant inferences by synthesizing concepts and ideas from a single reading selection 8 – Support conclusions drawn from ideas and concepts in expository text

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Writing Standards

Grade	Strand	Concept	Performance Objective
6	3	2 – Expository	1 – Record information (e.g. observations, notes, lists, charts, map labels and legends) related to the topic
		6 – Research	1 – Write a summary of information from sources (e.g. encyclopedias, Web sites, experts) that includes: a. paraphrasing to convey ideas and details from the source b. main idea(s) and relevant details
7	3	2 – Expository	1 – Record information (e.g. observations, notes, lists, charts, map labels and legends) related to the topic
		6 – Research	1 – Write a summary of information from sources (e.g. encyclopedias, Web sites, experts) that includes: c. paraphrasing to convey ideas and details from the source d. main idea(s) and relevant details
8	3	2 – Expository	1 – Record information (e.g. observations, notes, lists, charts, map labels and legends) related to the topic
		6 – Research	1 – Write a summary of information from sources (e.g. encyclopedias, Web sites, experts) that includes: e. paraphrasing to convey ideas and details from the source f. main idea(s) and relevant details

Social Studies Standards

Grade	Strand	Concept	Performance Objective
6	4	1 – The World in Spatial Terms	1 – Construct maps, charts, and graphs to display geographic information 3 – Interpret maps, charts, and geographic databases using geographic information 5 – Interpret thematic maps, charts, and databases depicting various aspects of world regions
		2 – Places and Regions	2 – Describe the factors that cause regions and places to change

Social Studies Standards Continued

Grade	Strand	Concept	Performance Objective
7	4	1 – The World in Spatial Terms	1 – Construct maps, charts, and graphs to display geographic information 3 – Interpret maps, charts, and geographic databases using geographic information 5 – Interpret thematic maps, charts, and databases depicting various aspects of world regions
		2 – Places and Regions	2 – Explain the concept of regions and why they change
		5 – Environment and Society	1 – Identify the physical processes (e.g., conservation of natural resources, mining, water distribution in Arizona) that influence the formation and location of resources
8	4	1 – The World in Spatial Terms	1 – Construct maps, charts, and graphs to display geographic information 3 – Interpret maps, charts, and geographic databases using geographic information 5 – Interpret thematic maps, charts, and databases depicting various aspects of world regions
		1 – The World in Spatial Terms	1 – Construct maps using appropriate elements (i.e., date, orientation, grid, scale, title, index, legend, and situation) 2 – Interpret maps and images (e.g., political, physical, relief, thematic, Geographic Information Systems [GIS] and Landsat)
High School	4	2 – Places and Regions	1 – Identify the characteristics that define a region: a. physical processes (i.e., climate, terrain, resources) b. human processes (i.e., religion, political organization, economy, demographics)
		3 – Physical Systems	1 – Analyze how weather and climate influence the natural character of a place (e.g., the effect of heat transfer, Earth's rotation, and severe weather systems)

Appendix B: Worksheets and Overheads

The pages that follow contain the worksheets listed below:

A. *World Map* – If a map is not available in the classroom, use the following world map as an overhead or student handout. (1 page)

B. *Reading Anticipation Guide* – Worksheet for students to fill out as they read the material presented on the "Exploring Arizona's Natural Resources" Web page (2 pages)

C. *Graphic Organizer Sample – Alpine Tundra* – Guide your students through a sample web by using this as a key or an overhead. (1 page)

D. *Biotic Communities Graphic Organizer* – One version of a web that your students can use as they study the biotic communities (1 page)

E. *Map of Arizona: Student Version* – A blank map that the students can use to map the biotic communities (1 page)

F. *Map of Arizona: Teacher Version* – The same map provided to students but with important locations labeled (1 page)

G. *Arizona Topography Map* – A shaded relief map showing elevations throughout the state (1 page)

H. *Average Annual Precipitation Map* – A map showing the average precipitation that areas of Arizona receive each year (1 page)

I. *Mapping Biotic Communities Rubric* – One possible method for assessing the student-generated maps (1 page)